Performance Report -- UVI Online Search Tool (UVI-OST)

Title of Grant:	A Climatological Database of Auroral Images for Solar Cycle 23: An Online Synoptic Search and Metadata Visualization Tool
Type of Report:	Annual Performance Report
Principal Investigator:	G. A. Germany
Period Covered:	5/1/2001 - 4/30/2002
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Summary of research objectives and plan

The primary goal of the funded work is to provide an online search and visualization tool of auroral and geophysical metadata covering the ascending phase of the current solar cycle. There are currently no tools available for searches of auroral features or for visualization of derived parameters such as boundaries, energy input, or presence of given auroral morphologies. The lack of such tools means that the vast majority of current research using auroral images is event-driven, where the only search criteria is the time of the event. The logistical difficulties of organizing synoptic studies spanning extended times, or of finding particular auroral morphologies regardless of the time of their occurrence, is one of the primary impediments for performing non-event-driven auroral studies.

In the first year the following tasks were scheduled.

- Conversion of existing UVI metadata into new metadata database.
- Ingestion of available geophysical indices.
- Development of non-image miners to generate metadata not converted from existing data collection.
- Generation of all non-image metadata.
- Online interface, including request handler and metadata visualization function, for non-image metadata.
- Begin development of image metadata miners

Most important results during report period

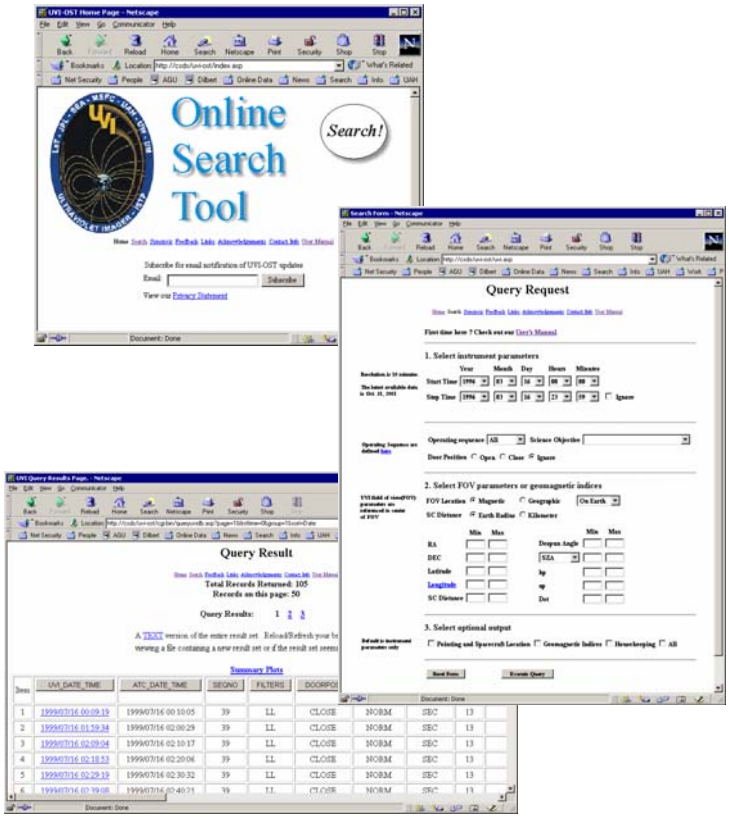
1. Development of online search interface to instrument metadata and geophysical data.
2. Online search tool made available for public access in January 2002.
3. Began development of non-image miners.
4. Established sub-contract with Southern Polytechnic University for development of image miners.

General summary of performance

The primary goal of the first year of performance was to take existing UVI metadata and create an initial search tool of this data. This tool is to serve as the foundation of the work done in the second and third years of the proposal.

This goal has been met and the results can be seen at http://csds.uah.edu/uvi-ost/. The online search tool (UVI-OST) allows queries of instrument parameters, field of view location, spacecraft location, and geophysical indices. Query results are display as onscreen sortable tables, downloadable text files, or as graphical summaries.

A particularly exciting recent development came recently when we realized we could link our output records to online UVI images offered by the UVI investigation. This means that we are able to move beyond our original goal of serving only metadata and offer, instead, direct links to UVI image data from our queries. This capability greatly enhances the value and utility of the UVI-OST project.



A detailed User Manual has been provided in anticipation of problems or questions that might arise. In addition, an online Feedback Form is provided, as well as an opportunity to subscribe to a mailing list of future updates. The intent is to make the interface as user-friendly as possible.

UVI-OST was announced for public access on January 22, 2002 and the response has been very positive, with over 300 visits to the site in the first two weeks and more than forty subscriptions to our email list. Our system logs indicate a dedicated core of users worldwide performing focused searches rather than randomly trying out features. It appears that the site is meeting the needs of the scientific community, as expected.

A secondary goal for the report period was to complete generation of non-image metadata, using software search tools referred to generically as non-image miners to distinguish them from the image miners planned for future work. Non-image metadata includes information such as spacecraft coordinates and location of the UVI field of view. This information has been included in the current UVI-OST. In addition, this category has been expanded to included topics originally believed only available from image analysis. These topics include percent of field of view on Earth, percent of oval in field of view, and image quality. All of these parameters are intended to allow the user to refine his query requests to only the image types of most use.

The proposal statement of work calls for this task to be completed in the first year of work. At the time of this writing (February 2002) this task is not yet complete. However, the requisite non-image miners are under development and we are optimistic that this task will be completed on schedule. One topic we are pursuing is a method of summarizing this information by graphical icons to allow the user to quickly estimate the suitability of given image data for research purposes.

Another goal of the first year was to begin development of image miners, software routines to search for information contained within the images. Toward that goal, we have established a sub-contract with Southern Polytechnic State University, Maretta, GA to allow Dr. Chih-Cheng Hung to work on this task. Dr. Hung has extensive image processing/analysis experience and was selected in the proposal for this task. Dr. Hung has met with the PI on

multiple occasions to outline the miner requirements and is currently working on their development. We hope to begin producing image metadata by the end of Summer 2002.

The table below gives a summary of progress to date compared with the goals and objectives set for this period.

Scheduled Task	**Status**
Conversion of existing UVI metadata into new metadata database.	Completed
Ingestion of available geophysical indices.	Completed
Development of non-image miners to generate metadata not converted from existing data collection.	In progress, expected completion in Spring 2002
Generation of all non-image metadata.	In progress, expected completion in Spring 2002
Online interface, including request handler and metadata visualization function, for non-image metadata.	Version 1 complete and online
Begin development of image metadata miners	Development has begun

Tasks to be carried out in the coming year

The proposal statement of work calls for the second year of effort to be devoted to the following tasks.

- Complete development of image metadata miners.
- Begin processing image metadata.
- Develop online interfaces for image metadata.

In addition, we plan to enhance the results query to be more interactive and intelligent. Under the proposed enhancements, the user will receive more useful summaries of large result sets and guidance on refining available queries. We also plan to refine the graphical display capabilities for metadata display.

Finally, we plan to continue responding to user suggestions to make sure this tool meets the community needs.